

CLAIMS

1. A lead storage battery including:

an electrode plate pack comprising a plurality of negative electrode plates which each comprise a negative electrode grid having a tab and a negative electrode active material layer retained by said negative electrode grid, a plurality of positive electrode plates which each comprise a positive electrode grid having a tab and a positive electrode active material layer retained by said positive electrode grid, and a plurality of separators separating said positive electrode plate and said negative electrode plate;

a positive electrode connecting member comprising a positive electrode strap to which said tab of each positive electrode plate of the electrode plate pack is connected, and a positive electrode pole or a positive electrode connecting body provided at said positive electrode strap; and

a negative electrode connecting member comprising a negative electrode strap to which said tab of each negative electrode plate of the electrode plate pack is connected, and a negative electrode pole or a negative electrode connecting body provided at said negative electrode strap,

wherein said positive electrode grid, said negative electrode grid, said positive electrode connecting member, and said negative electrode connecting member comprise a Pb-alloy including at least one of Ca and Sn,

said negative electrode active material layer includes Sb, and

said separator includes silica.

2. The lead storage battery in accordance with claim 1, wherein said separator comprises a microporous synthetic resin sheet and silica particles dispersed in said synthetic resin sheet, and includes 40 to 85 % by mass of said silica particles.

3. The lead storage battery in accordance with claim 1, wherein said separator comprises a fiber mat and silica particles retained by said fiber mat, and includes 10 to 40 % by mass of said silica particles.

4. The lead storage battery in accordance with claim 1, wherein said negative electrode active material layer includes 0.0002 to 0.006 parts by mass of said Sb per 100 parts by mass of the negative electrode active material and Sb in total.

5. The lead storage battery in accordance with claim 1, wherein said positive electrode grid has a lead alloy layer containing Sn in at least a part of a surface thereof.

6. The lead storage battery in accordance with claim 1, wherein said separator is shaped like a bag, and accommodates said negative electrode plate.

7. The lead storage battery in accordance with claim 2, wherein said separator contains 5.0 to 30 % by mass of an oil.

8. The lead storage battery in accordance with claim 1, wherein a mass ratio of the negative electrode active material to the positive electrode active material in said electrode plate pack is 0.7 to 1.3.

9. The lead storage battery in accordance with claim 1, wherein

said negative electrode grid is an expanded grid comprising an expanded mesh retaining said negative electrode active material layer, a frame provided at an upper edge portion of said expanded mesh, and said tab connected to said frame, and

a ratio of a height of said tab to a width of said frame is 2.2 to 15.0.

10. The lead storage battery including:

an electrode plate pack comprising a plurality of negative electrode plates which each comprise a negative electrode grid having a tab and a negative electrode active material layer retained by said negative electrode grid, a plurality of positive electrode plates which each comprise a positive electrode grid having a tab and a positive electrode active material layer retained by said positive electrode grid, and a plurality of separators separating said positive electrode plate and said negative electrode plate;

a positive electrode connecting member comprising a positive electrode strap to which said tab of each positive electrode plate of the electrode plate pack is connected, and

a positive electrode pole or a positive electrode connecting body provided at said positive electrode strap; and

a negative electrode connecting member comprising a negative electrode strap to which said tab of each negative electrode plate of the electrode plate pack is connected, and a negative electrode pole or a negative electrode connecting body provided at said negative electrode strap,

wherein said positive electrode grid, said negative electrode grid, said positive electrode connecting member, and said negative electrode connecting member comprise a Pb-alloy including at least one of Ca and Sn,

said negative electrode active material layer includes Sb,

said separator includes silica, and

the mass ratio of the negative electrode active material to the positive electrode active material in said electrode plate pack is 0.7 to 1.3.